UNITED STATES PATENT APPLICATION

FOR

A METHOD AND SYSTEM FOR LOCALIZED ADVERTISING
USING LOCALIZED 3-D TEMPLATES

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A METHOD AND SYSTEM FOR LOCALIZED ADVERTISING
USING LOCALIZED 3-D TEMPLATES

This patent claims priority based on U.S. Provisional Patent Application Serial

No. 60/203,496, filed on May 11, 2000, incorporated herein by reference; and U.S.

5   Provisional Application Serial No. 60/204,875, filed on May 16, 2000, incorporated

herein by reference.

FIELD OF THE INVENTION

The present invention relates generally to the field of video processing systems,

10   and, more specifically, to a method and system for localized advertising using localized

3-D templates.

BACKGROUND OF THE INVENTION

During the process of video and image editing, one alters portions or all of a

video image, e.g. by moving an image from one portion of a screen to another, rotating

15   the image, expanding the image or shrinking the image. Other common image

manipulations include warping an image (i.e. deforming the image in three dimensions),

magnifying parts of an image, performing cylindrical, spherical, hyperbolic, or parabolic

transformations to the image (e.g. causing a two-dimensional image to appear to bend

or wrap around a cylindrical, spherical, hyperbolic or parabolic surface), melting images,

20   etc. Parabolic transformations may be used to provide a three dimensional (3-D) effect.

Frequently, the image to be manipulated is in the form of a pixel array. In other words, the image is stored as an array of data values, each value corresponding to the color and brightness of a small area of the image. When performing the above-mentioned video image manipulations, one typically performs calculations to transform

5   every pixel of the image. For example, for each pixel of the image, one performs calculations to determine a new location for that pixel on a video screen. Large images can contain millions of pixels. Further, for the case of image streams (e.g. as in the case of video images), dozens of frames per second must be transformed. Thus, many millions of pixels may have to be analyzed and modified for each transformation in a

10   very short amount of time. Such transformations require either enormous CPU resources or special hardware to be able to transform large numbers of pixels in a short amount of time.

Although some 3-D video standards are already developed and have, for example, been included in the Motion Picture Experts Group 4 (MPEG4) video

15   standard, these standards require specialized transmission systems, players, etc., which may not be installed into common commercial video broadcasting systems for a long time.

In addition, the amount of data transmitted in real 3-D video broadcasting on a regular basis is so large that it can be overwhelming for present-day delivery systems

20   and for systems anticipated in the near future.

3

Furthermore, 2-D television broadcasts include 2-D advertisements that are not viewer specific. For example, the advertisement may be nationally broadcast, but not localized to a specific viewer or localized group of viewers.

SUMMARY OF THE INVENTION

A method and system for localized advertising using localized 3-D templates is disclosed. In one embodiment, a method for providing enhanced advertising of a 2-D video broadcast, comprises receiving the 2-D video broadcast, wherein the 2-D video broadcast comprises a 2-D advertisement containing a 2-D image, and one or more 3-D shapes of text; generating a 3-D highlighted image from the 2-D image; applying the 3-D shapes of text to the 3-D highlighted image to generate a localized 3-D highlighted image; and displaying the localized 3-D highlighted image to a specific viewer.

Other features of the present invention will be apparent from the accompanying drawings and from the detailed description, which follows.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example and not limitation in the figures of the accompanying drawings, in which like references indicate similar elements and in which:

Figure 1 illustrates an exemplary prior art 2-D advertisement display;

Figure 2 illustrates an exemplary computer architecture 200 used to implement the present 3-D enhanced advertising method;

Figure 3 illustrates an exemplary approach to the present method;

Figure 4 illustrates an exemplary advertisement display having a S-D highlighted rendering;

Figure 5 illustrates an exemplary localized advertisement 500 with 3-D enhancement; and

Figure 6 illustrates an exemplary flow diagram of the process performed by architecture 200 for providing 3-D enhanced localized advertising.

DETAILED DESCRIPTION

A method and system for localized advertising using localized 3-D templates, is described. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present

5   invention. It will be evident, however, to one skilled in the art that the present invention may be practiced without these specific details.

In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be evident, however, to one skilled in the art that the present invention

10   may be practiced without these specific details. In some instances, well-known structures and devices are shown in block diagram form, rather than in detail, in order to avoid obscuring the present invention. These embodiments are described in sufficient detail to enable those skilled in the art to practice the invention. It is to be understood that other embodiments may be utilized and that logical, software, re-

15   ordering of steps, and other changes may be made without departing from the scope of the present invention.

Some portions of the detailed descriptions that follow are presented in terms of algorithms and symbolic representations of operations on data bits within a computer memory. These algorithmic descriptions and representations are the means used by

20   those skilled in the data processing arts to most effectively convey the substance of

7

their work to others skilled in the art. An algorithm as described here, is generally conceived to be a self-consistent sequence of acts leading to a desired result. The acts are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of

5 being stored, transferred, combined, compared, and otherwise manipulated. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like.

It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels

10 applied to these quantities. Unless specifically stated otherwise as apparent from the following discussion, it is appreciated that throughout the description, discussions utilizing terms such as "processing" or "computing" or "calculating" or "determining" or "displaying" or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented

15 as physical (electronic) quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices.

The present invention can be implemented by an apparatus for performing the

20 operations herein. This apparatus may be specially constructed for the required

8

purposes, or it may comprise a general-purpose computer, selectively activated or reconfigured by a computer program stored in the computer. Such a computer program may be stored in a computer readable storage medium, such as, but not limited to, any type of disk including floppy disks, optical disks, CD-ROMs, and magnetic-optical disks,

5   read-only memories (ROMs), random access memories (RAMs), EPROMs, EEPROMs, magnetic or optical cards, or any type of media suitable for storing electronic instructions, and each coupled to a computer system bus.

The algorithms and displays presented herein are not inherently related to any particular computer or other apparatus. Various general purpose systems may be used

10 with programs in accordance with the teachings herein, or it may prove convenient to construct more specialized apparatus to perform the required method. For example, any of the methods according to the present invention can be implemented in hard-wired circuitry, by programming a general purpose processor or by any combination of hardware and software. One of skill in the art will immediately appreciate that the

15 invention can be practiced with computer system configurations other than those described below, including hand-held devices, multiprocessor systems, microprocessor-based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, and the like. The invention can also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked

through a communications network. The required structure for a variety of these systems will appear from the description below.

The methods of the invention may be implemented using computer software. If written in a programming language conforming to a recognized standard, sequences of

5   instructions designed to implement the methods can be compiled for execution on a variety of hardware platforms and for interface to a variety of operating systems. In addition, the present invention is not described with reference to any particular programming language. It will be appreciated that a variety of programming languages may be used to implement the teachings of the invention as described herein.

10   Furthermore, it is common in the art to speak of software, in one form or another (e.g., program, procedure, application...), as taking an action or causing a result. Such expressions are merely a shorthand way of saying that execution of the software by a computer causes the processor of the computer to perform an action or produce a result.

15   **Figure 1** illustrates an exemplary prior art 2-D advertisement display. More specifically, **Figure 1** shows a pseudo 3-D view of a split screen in virtual room 100 with two screens 101 and 102 as flat geometric surfaces suspended on the walls of the room.

On screen 101 an advertisement for Coca Cola, for example, is running, with

20   Coke bottle 110 visible. Even though this is a virtual 3-D world, because the video

source is a 2-D source, virtual screen 101, is essentially flat or slightly cylindrical, and

displays a simple object. Although one of ordinary skill in the art may use color

information, etc., to derive a Z component for such a flat object, the results could be

rather strange in some cases, because color can change with the lighting when

5   advertisements are video taped. Typically, such advertisements may have enhanced

special lighting effects, which in such cases can result in very strange deformations of

the object.

   Figure 2 illustrates an exemplary computer architecture 200 used to implement

the present 3-D enhanced advertising method. Architecture 200 represents an

10   integrated multi-processor, in which elements of the present method and system for

providing 3-D enhanced advertising may be implemented. Architecture 200 may be a

set top box, computer, or similar device. One embodiment of computer architecture

200 comprises a system bus 220 for communicating information, and a processor 210

coupled to bus 220 for processing information. Computer architecture 200 further

15   comprises a random access memory (RAM) or other dynamic storage device 225

(referred to herein as main memory), coupled to bus 220 for storing information and

instructions to be executed by processor 210. Main memory 225 also may be used for

storing temporary variables or other intermediate information during execution of

instructions by processor 210. Computer architecture 200 also may include a read only

11

memory (ROM) and/or other static storage device 226 coupled to bus 220 for storing

static information and instructions used by processor 210.

A data storage device 227 such as a magnetic disk or optical disc and its

corresponding drive may also be coupled to computer architecture 200 for storing

5   information and instructions. Computer architecture 200 can also be coupled to a

second I/O bus 250 via an I/O interface 230. A plurality of I/O devices may be coupled

to I/O bus 250, including a display device 243, an input device (e.g., an alphanumeric

input device 242 and/or a cursor control device 241). Display device 243 may be a

television, computer monitor, or liquid crystal display. The input device may also

10   include a keyboard, mouse, trackball, or remote controller.

The communication device 240 is for accessing other computers via a network.

The communication device 240 may comprise a modem, a network interface card, or

other well known interface device, such as those used for coupling to Ethernet, token

ring, or other types of networks, including the internet.

15   **Figure 3** illustrates an exemplary approach to the present method. Screen 301

is shown with Coke bottle 310 on it. Screen 301 is flat and rectangular in one

embodiment. However in alternate embodiments screen 301 may be a different shape

and contoured. For example, screen 301 may have a cylindrical or spherical warp to it,

or it may be wrapped onto some other object, such as a column, but essentially the

20   surface is similar to a flat sheet of paper. Also, a limited number of horizontal grid lines

12

340 a through n are symbolized, which go straight through Coke bottle 310, indicating

that the image of the bottle 310 is a flat geometric surface. Gridlines 140 a –n may not

be visible to a viewer.

In addition, a web link may be incorporated into the Coke bottle to display

5   additional information to allow the viewer to surf to a local shopping outlet. As the ad is

playing, this link may, for example, also be used to identify object 310 in the ad and to

refer to a look-up table to see if there is a 3-D object corresponding to object 310 in a

library that is local in the viewer's set-top box, or computer having an architecture 200.

That library may be broadcast to all set-top boxes on the broadcasting system on a

10   regular basis and updated, or it may be loaded over the Internet or any other type of

network connection including all known caching and buffering techniques.

3-D object 320 has a matching ID to coke bottle 310. In a visualized form, object

320 may be pushed with arrow 330 into flat geometric surface 301 so as to deform it.

Figure 4 illustrates an exemplary advertisement display having a 3-D highlighted

15   rendering. **Figure 4** shows the resulting deformation that has a half Coke bottle pushed

out of the flat geometric surface into shape 450 shown in the deformation of grid lines

340 a through n on surface 301'.

Still overlaid on the correct location is the image of actual Coke bottle 310, so the

video image is preserved, and by overlaying shades and specular lighting, the visual

20   enhancement of the object can heightened.

As a result, it is possible to create a visual impression that makes the advertised object appear to be practically jumping out of the screen at the viewer.

Figure 5 illustrates an exemplary localized advertisement 500 with 3-D enhancement. Prior art systems and methods of localizing advertisements involve the broadcasting of specific character-based text to the set-top boxes of specific individual viewers or localized viewer groups. Localized advertisement 500 includes a localized 3-D image (coke bottle 310) in which viewer specific phone number 510 is visible, however specific character-based text is not broadcast. Instead, 3-D shapes of text, such as, phone number 510 are broadcast to the specific viewer's set-top box. In addition, the geometry of the 3-D shape (coke bottle 310), is altered in one of several ways to create the readable 3-D text shapes or characters.

Advertisement 500 includes lines 140 a-n, which symbolize mesh lines going through the volume of the bottle. The area of coke bottle 310 that displays phone number 510 also represents a template. In advertisement 500, the template has been cut out of the mesh 140 a-n, creating textual sized openings in mesh 140 a-n. Mesh 140 a-n may no longer be a continuous geometric surface at the areas covered by the template. Since coke bottle 310 is a 3-D image, the template allows the background that lies behind the mesh to be visible. If no background color is specified, a default color may be used, such as black. In one embodiment, a special contrast color may be

displayed, generating highlighted text 510. Although text 510 displays "1-800-

555coke", any similar image may be placed within advertisement 500 in any orientation.

In an alternate embodiment, rather than cutting out portions of mesh 140 a-n,

characters, such as text 510, may be embossed into mesh 140 a-n. Embossed coke

5   bottle 310 will include continuous mesh 140 a-n, however, mesh 140 a-n will be

deformed. For example, to create embossed character images, the level of the mesh

will be pushed back to a predetermined distance. That distance may be flush with

screen 101. As a result, with appropriate specular shading and lighting, the embossed

character image appears shadowed, and/or in a specific color.

10   In yet another embodiment, text 510 may be raised character images. For

example, a raised character image appears visually even closer to the viewer. In

addition the raised image may be increased in size, or with additional enhancements to

color.

Thus, specific mesh geometries (3-D shapes of images) may be sent to set-top

15   boxes, no actual characters are sent. Furthermore, multiple mesh geometries may be

sent, each containing a unique identifier, which when interpreted by the receiving set-

top box, allows the set-top box to select the specific mesh geometric for the specific

viewer.

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In an alternate embodiment, a set top box may store a library of mesh

geometries, and the broadcast sends a unique identifier to indicate the appropriate

mesh to be used.

Figure 6 illustrates an exemplary flow diagram of the process performed by

5   architecture 200 for providing 3-D enhanced localized advertising. The process starts

at block 601. At processing block 610, architecture 200 receives a 2-D video

broadcast. The video broadcast contains a 2-D advertisement in which there is at least

one 2-D image. Also included are 3-D shapes of text. The advertisement may be for

Coca-Cola and the 2-D image may be a coke bottle 310.

10   Flow continues to processing block 620, where architecture 200 generates a 3-D

highlighted image according to the techniques described above. One of ordinary skill in

the art may be able to render an image, according to the tecniques described in co

pending application _____ filed on _____, entitled "Method and

Apparatus for Using a General Three-Dimensional (3D) Graphics Pipeline for Cost

15   Effective Digital Image and Video Editing, Transformation, and Representation" by

Yakov Kamen and Leon Shirmar. At processing block 630, architecture 200 applies the

3-D shapes of text to the 3-D highlighted image 310. A localized advertisement is thus

generated. [Dan, can you provide more information about where the localized data is

generated?] The 3-D image rendered may contain specular lighting and shading. The

16

resulting advertisement may be displayed by architecture 200 by a display 243, such as a television or monitor. The process ends at block 599.

The present techniques provide increased visual impact than conventional 2-D television broadcasting.

5   Thus, a method and system for localized advertising using localized 3-D templates have been described. Although the present invention has been described with reference to specific exemplary embodiments, it will be evident that various modifications and changes may be made to these embodiments without departing from the broader spirit and scope of the invention. Accordingly, the specification and 10   drawings are to be regarded in an illustrative rather than a restrictive sense.